

PROFESSIONAL FORUM



Owning the Night

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The U.S. Army has long relied upon night operations to maintain an edge on the battlefield, and the ability to dominate the night was demonstrated during Operation DESERT STORM. In 1992, the Dismounted Battlespace Battle Lab at Fort Benning, Georgia, was given the responsibility for horizontally integrating own-the-night (OTN) technologies throughout the force.

The first step toward this goal was to develop a concept of night fighting capabilities that would establish the objective requirements for fighting and winning on the battlefield. The second step was to use this concept to conduct two advanced warfighting experiments—one at squad and platoon level and another at company and battalion level.

The Battle Lab identifies new ideas and technologies and coordinates with industry, various Army laboratories, and other members of the technology base to develop them. The Battle Lab then experiments, studies, models, and analyzes the capabilities to develop materiel and force structure requirements to prepare for and meet future challenges. These experiments integrate doctrine, training, leader development, organization, materiel, and soldier (DTLOMS) requirements and culminate in field experiments and demonstrations using tactical Army units and

soldiers to employ the new technology and equipment.

One of the problems encountered in trying to analyze OTN was the lack of baseline data for comparison. Until the night fighting capabilities concept established the requirement to pursue own-the-night initiatives, night fighting devices were developed piecemeal for



individual weapons or items of equipment on the basis of narrow requirements for one slice of the battlefield. The worldwide proliferation of night fighting technologies, the availability of current equipment on the open market, and the diverse nature and the sophistication of our potential enemies demand that we attain our objective capabilities by integrating solutions from all elements of DTLOMS.

In October 1992 the Battle Lab conducted a squad and platoon level OTN

experiment at Fort Benning to develop a baseline. In this experiment, Battle Lab personnel used a platoon from the 3d Brigade, 24th Infantry Division, to employ a variety of night fighting technologies and to conduct experiments in target detection, range firing, defensive live fire, and both dismounted and mounted squad and platoon exercises. (The results of this experiment are provided in the final test report, "Concept Evaluation Program Test of the Infantry Platoon Night Fighting System," April 1993.)

The second Advanced Warfighting Experiment was conducted from 23 September to 28 October 1993 at Fort Campbell, Kentucky. The purpose of this joint, combined arms experiment was to validate the basis-of-issue plan for a system of night fighting equipment; to demonstrate and evaluate the doctrinal TTPs (tactics, techniques, and procedures), training, leader development, organizational, and soldier support implications of this system of equipment; and to refine operational requirements for the emerging technologies associated with this system of equipment. This effort supported the Louisiana Maneuvers OTN issue. The objectives included identifying technologies that showed promise as warfighting enhancements to lethality and survivability and focused on TTPs

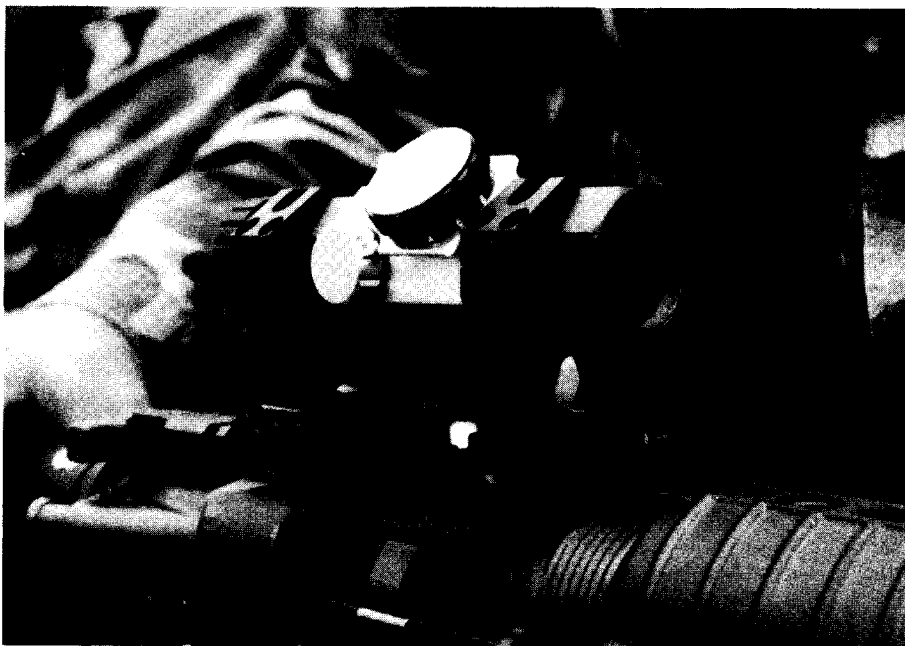
that improved joint, combined arms operations at night.

At Fort Campbell, the Battle Lab's OTN team assessed the military utility and effectiveness of various night fighting equipment items and technologies. The team observed and documented changes to TTPs to improve company and battalion operations in reduced visibility conditions. The experiment also provided an opportunity to look at other Soldier Enhancement Program (SEP) items to determine their military usefulness and effectiveness. The Infantry School will use the results to support decisions concerning night fighting tactics, techniques, and materiel use.

The 2d Brigade, 101st Airborne Division, supported the advanced warfighting experiment during its gold training cycle. The Battle Lab worked closely with the brigade's commanders and staff and its supporting combat support (CS) and combat service support (CSS) units to make sure the OTN issues, equipment, and technologies supported and enhanced the brigade's training objectives.

The brigade's units included an air assault infantry battalion, a forward support battalion, a Military Police (MP) platoon, an engineer battalion, and a military intelligence battalion. Army UH-60, CH-47, and AH-64 helicopters; Marine Corps UH-1 gunships; and Air Force AC-130, F16, and A-10 aircraft supported these units. The pilots experimented with the OTN equipment normally employed by ground units to mark landing and pick-up zones, identify friendly unit locations, and designate targets for attack aircraft.

All air missions were flown at night in support of the battalion's training missions. U.S. Marine Corps ANGLICO (air and naval gunfire liaison company) teams and Air Force liaison teams controlled the aircraft using hand-held laser pointers, infrared marking beacons, thermal heat pads, and strobes. A mix of equipment supported the aircraft using both thermal imaging and image intensification devices. Ground troops carried marking equipment to use in identifying their positions to the aircraft



Red dot sight with lenses enclosed in a sealed tube.

flying close air support. This was important in developing techniques and procedures the soldiers on the ground could use to work with supporting aircraft at night. With the use of OTN equipment, targets and friendly positions can be identified to the aircraft at night, allowing them to kill enemy targets with less risk of fratricide.

A Navy SEAL (sea, air, land) team also trained at Fort Campbell during the experiment. The Battle Lab provided the team with OTN equipment to use in MOUT (military operations on urban terrain) training—AN/PVS-7B night vision goggles, three-power magnifier lenses for the goggles, AN/PVS-7B compass, AN/PAQ-4B aiming light, GCP-1 and LPL-30 hand-held laser pointers, Phoenix codeable infrared light (known as Buddlights), pocket scopes, and monocular night vision goggles. The SEAL team's assessments gave the OTN team an opportunity to develop the technology jointly. (Joint development saves acquisition dollars and justifies speeding up the acquisition process to get the items in the hands of the soldiers.)

The advanced warfighting experiment began with range firing the M16A2 using the red dot optical sight during the day and various IR aiming lights at night. The Battle Lab also experimented with extending the range of the M249 light machinegun at night by using laser aiming devices and a new

third-generation AN/PVS-4. The brigade elements assessed the utility and capability of new technology to enhance combat operations.

The purpose of the red dot sight experiment was to assess the training requirements and military utility of the sight in improving unit combat effectiveness. The sight reticle consists of a sharp luminous red dot with adjustable intensity that is projected onto an optical element and reflected back to the firer's eye. When the sight is boresighted to the rifle, the bullet impact is approximately where the red dot overlays the target. The red dot is not projected onto the target; it is visible only within the sight reticle. Two types of sights were used for this experiment—one with exposed lenses and one with lenses enclosed in a sealed tube.

The major findings of the red dot sight experiment related to training requirements, training transfer, and zeroing the sight. The test showed a high degree of training transfer from iron sights to using the red dot sight. In general, soldiers who qualified as expert marksmen with iron sights did not find a significant benefit in using the red dot. On the other hand, soldiers who had difficulty with iron sights improved their marksmanship with the red dot sight.

Zeroing the M16A2 with the red dot sight required about the same number of rounds as required in zeroing the rifle's iron sights. The test also showed that



This night photo made using third-generation image intensification technology reveals a soldier wearing the AN/PVS-7B night vision goggles.

the sight adjustments needed to be consistent with the M16A2 iron sights and zero target. (These findings and other design recommendations were included in a separate Dismounted Battlespace Battle Lab report titled "Experimentation and Analysis of the Utility and Training of the Red Dot Optical Sight," December 1993.)

The night-firing portion of the experiment compared three aiming lights: the AN/PAQ-4A, the AN/PAQ-4B, and the IRAD (infrared aiming device) 2500. Two questions were addressed: Is zeroing at 25 meters better with one of these aiming lights than with the other? Is there a difference in the number of targets hit at various ranges with the different aiming lights?

The Army Research Institute (ARI) field unit at Fort Benning assisted with these comparisons, collected and analyzed data, and provided an interim report for inclusion in the final report of the company and battalion level experiment.

The resulting data supported the idea that different zeroing procedures are needed for aiming lights. It is difficult to obtain a good aim point for two reasons—the lack of a clear image through night vision goggles and the blooming effect that obscures the small silhouette when the aiming light hits the 25-meter zero target.

Shot groups with aiming lights at night were consistently larger than shot

groups with iron sights in daylight zeroing. The large shot groups made it difficult to zero the aiming lights and contributed to the lower hit probability on the qualification range.

The aiming light comparisons during range firing showed no significant differences in the number of targets hit with the different aiming lights. Performance decreased significantly at ranges greater than 100 meters, and only chance hits were obtained at 200 meters. This low hit probability beyond 100 meters can be attributed partly to problems in zeroing and training. The primary reason for the low hit probability at 200 meters was the soldiers' inability to detect targets with the AN/PVS-7B night vision goggles.

In the platoon OTN experiment and in other trials during the company and battalion experiment, hit probability at ranges greater than 100 meters was increased when the three-power magnifier lens was used. The lens extends the range of the goggles out to 300 meters and is effective in stationary observation

and target detection roles. The weight and magnification, however, make the device difficult to use during dismounted movement.

The M249 machinegun night fire exercises were performed to determine the effectiveness of various devices, including the AN/PAQ-4B with AN/PVS-7B goggles, the IRAD 2500 with AN/PVS-7B goggles, the AN/PAQ-4B with AN/PVS-7B's three-power magnifier lens, the third-generation AN/PVS-4, the thermal weapon sight, and the baseline second-generation AN/PVS-4.

All of these experimental devices outperformed the second-generation AN/PVS-4s now on hand in the unit. The third-generation AN/PVS-4s provided the best results with target hits out to 600 meters. The iterations with the aiming light—AN/PVS-7B—three-power lenses and the thermal weapon sight all increased the M249's long-range hit probability at night. The three-power lens attached to the AN/PVS-7B during M249 firing increased by 400 meters the range at which targets were effectively engaged. The results are summarized in the accompanying table.

Following the range firing, the experiment focused on incorporating the experimental equipment into the unit training missions. The air assault battalion conducted a series of platoon exercises in which each company rotated through a force-on-force platoon assault, a platoon live-fire assault on a bunker system, a platoon live-fire ambush, and a company defense. OTN equipment was used during all these missions, and Battle Lab personnel observed and documented the tactics, techniques, and procedures for employing the equipment. Data was collected

DEVICE	RANGE: 100M	200M	300M	400M	500M	600M
II Generation AN/PVS-4	100%	100%	100%	60%		
III Generation AN/PVS-4	100%	100%	100%	100%	80%	60%
Thermal Weapon Sight	100%	100%	100%	100%		
Aim Light/AN/PVS-7B/3X Lens	100%	100%	100%	60%	50%	50%
Aim Light/AN/PVS-7B	100%	60%				

through questionnaires filled out by the soldiers after each iteration.

The final results (which will be published in the "Own the Night Advanced Warfighting Experiment" report) identify both training and materiel problems that must be addressed. The technology and equipment the battalion used were well received by the soldiers and leaders. Technology is available today to satisfy most of our night fighting requirements. Developing ways to train soldiers to operate with the improved equipment in periods of reduced visibility should be our most important goal.

Another major element of the experiment was the work done with CS and CSS elements. The FSB in the experiment established a brigade support area (BSA) to conduct its normal missions of resupply, maintenance, and medical operations. The support battalion conducted convoys and BSA security using OTN equipment to improve their night capability. Data on each piece of equipment used was collected through soldier questionnaires.

The FSB was particularly interested in the added capability of the AN/PVS-7B and other image intensification devices. Night vision goggles and pocket scopes significantly increase the night vision capability now available in CS and CSS units. The FSB was also interested in the flip-up helmet mount and the snap-on compass for the AN/PVS-7B goggles. The helmet mount attaches the

goggles to the Kevlar helmet to provide a more comfortable fit; the compass snaps onto the goggles and gives the soldier an azimuth while he is looking through the goggles.

The MP platoon conducted the missions of main supply route security and marking, traffic control point security, and rear area security against a Level II threat. The Military Police School Battle Lab task force supported the Dismounted Battlespace Battle Lab with personnel to evaluate and gather data on the MP platoon's portion of the experiment.

The two equipment items that offered the most significant capabilities for the MPs were the driver's viewer enhancement (DVE) and the electronic filmless camera.

The DVE offered the user excellent night driving capabilities as well as target identification and acquisition using the three-power magnification mode for the second generation forward looking infrared (FLIR). A system with these capabilities has important MP applications in both combat operations and operations other than war (OOTW).

The electronic filmless camera enabled the user to transmit real time battlefield images to a remote location using organic communications. The camera's primary application for the three-man MP team was its ability to interface with battlefield digitization in

combat operations. The interface allowed the team to send and receive updated intelligence reports supported by pictures day or night.

The company and battalion own-the-night advanced warfighting experiment provided insights for near-term solutions by examining innovative uses of different developmental and nondevelopmental items. The experiment looked at the equipment along with new tactics, techniques, and procedures. It also validated the results of the platoon and squad level experiment conducted by the Dismounted Battlespace Battle Lab in October 1992 at Fort Benning.

The results of the previous experiments have established the base for an OTN Advanced Warfighting Demonstration with the 101st Airborne Division at the Joint Readiness Training Center in March 1994. The conclusions from this rotation will lead to the development of a recommended battalion basis of issue and validated TTPs to give the field a synergistic system of night fighting equipment.

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Warfighting Experiment

During 1994 Infantry Conference

MAJOR THOMAS G. DODD

The agenda for the 1994 Infantry Conference, which is to be held at Fort Benning 9-12 May, will include an

advanced warfighting experiment prepared and presented by the Dismounted Battlespace Battle Lab.

This experiment will feature a series of force-on force situational training exercises (STXs).